Presentation to
Blue Ribbon Water Task Force

Water Rights Adjudications
And
Hydrographic Surveys

John R. D'Antonio, Jr., P.E.
State Engineer

October 23, 2003
http://www.ose.state.nm.us/

Office of the State Engineer
nm
Interstate Stream Commission

Mark Fesmire, P.E., J.D.
Chief Hydrographic Survey Bureau

HYDROGRAPHIC SURVEY BUREAU MISSION

- To bring the discernible elements of a water right before the Court for examination and adjudication

Mark Fesmire, P.E., J.D.
Chief Hydrographic Survey Bureau

HYDROGRAPHIC SURVEYS

- Mission of the Hydrographic Survey
- Current Surveys
- Anatomy of the Hydrographic Survey
- Old Maps
- New Maps
- Steps in Adjudication

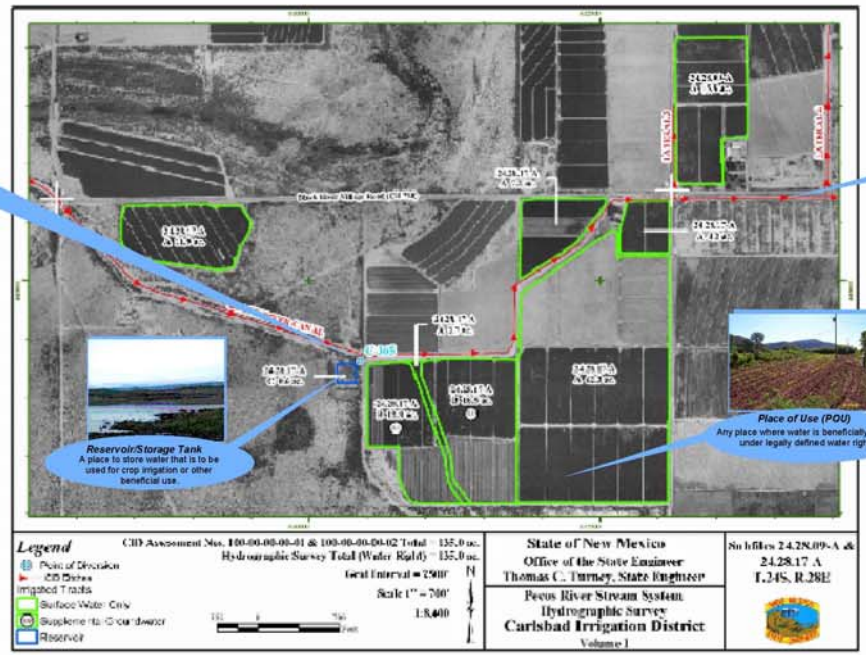
Mark Fesmire, P.E., J.D.
Chief Hydrographic Survey Bureau

In a nutshell, what we do is …

The Anatomy of a Hydrographic Survey

A Hydrographic Survey is a detailed study of water usage in a specific area. The information from this study is used in a court of law to legally determine the right of water users. The State Engineer or a judge orders a Hydrographic Survey of a stream system or groundwater basin.

Point of Diversion (POD)
Any point (well, diversion dam, etc.) at which water is diverted from its course for use in some beneficial application.



Ditch (Acequia)
…ed to convey water for irrigation purposes.

Step 1: Information Collection & Planning

The Office of the State Engineer (OSE) staff review water rights records, obtain digital orthorectified imagery, analyze water uses and verify land ownership records.

Step 2: Field Data Collection

OSE staff field check all water uses and survey the irrigated tracts, POD's, reservoirs, etc. using Global Positioning System (GPS) technology.

Step 3: Owner Interviews

Land owners are interviewed to obtain any additional information concerning water uses and irrigated tract boundaries.

Presented by:
New Mexico Office of the State Engineer
Hydrographic Survey Bureau
July, 2002

http://www.seo.state.nm.us

Step 4: Information Processing

OSE staff input and process collected data in the Geographic Information System (GIS) and produce final Hydrographic Survey maps.

Step 5: Publication & Release

A Consumptive Irrigation Requirement (CIR) is calculated based on the crops within the survey area. This and other relevant data and final maps are compiled into a report and sent to legal staff and courts.

Step 6: Litigation

An offer of judgment is sent to each water right owner; owner can accept or reject offer. After resolution, court confirms the agreements reached. Water right owners have the opportunity to challenge water rights of others. Hearings are then held to resolve challenges. A judge issues a final decree defining all water rights in the adjudicated area.

Imagery and Mapping

Dario Rodriguez-Bejarano, PhD, Hydrographic Survey Bureau

IMAGERY IN HYDROGRAPHIC SURVEYS

- Aerial photography
- Digital Aerial Imagery
- Old Maps
- New Maps

MAPPING FOR ADJUDICATIONS

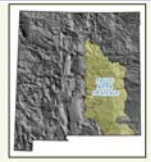
- Geo-spatial Components of a Hydrographic Survey

Dario Rodriguez-Bejarano, PhD
Hydrographic Survey Bureau

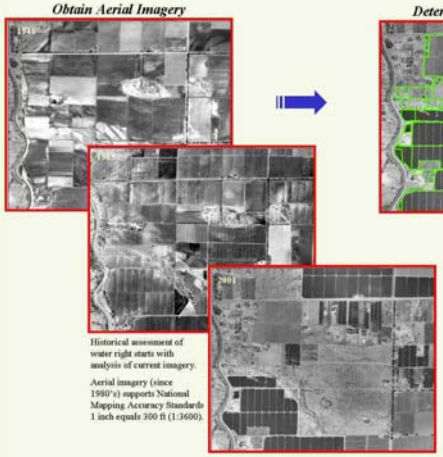
The mapping process …

Geospatial Components of a Hydrographic Survey

Presented by
New Mexico Office of the State Engineer, Hydrographic Survey Bureau
July 2003



Obtain Aerial Imagery



Historical assessment of water right starts with analysis of current imagery.

Aerial imagery (since 1980's) supports National Mapping Accuracy Standards 1 inch equals 300 ft (1:3600).

Determine Place of Use (POU)[1]

Digitize irrigated tracts.

Overlay & Compare

Compare current irrigation patterns to historical Hydrographic Surveys.

Field Inspections

Obtain deed information from Assessor's office, interview owners, verify irrigation and well location with GPS[2] coordinates, and digitally document.

Classify Water Use

Delineate surface water right, no right, reservoir, supplemental groundwater right, etc.

COGO[3] deeds and compare with irrigated tracts.

Identify surface and groundwater Points of Diversion (POD)[4], i.e. conveyances, springs, infiltration gallery, and wells.

Identify Additional Water Right Features

Filing map[5] for groundwater well, POD# C-1172

Georectify

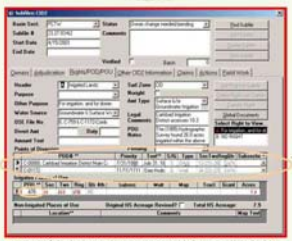
Vectorize features (POU, POD, conveyances) from georectified filing maps; identify tracts irrigated by groundwater wells.

Status of Water Use

Map both surface and groundwater (supplemental) rights and link field photos.

MS Access 2000 macro exports GIS data to WRATS database.

WRATS



WRATS[6] database contains POD and POU information linked with the GIS for analysis and reporting.

Terminology & Specifications

Hydrographic Survey: the collection of field, historic and other water use data to determine the ownership, nature, priority and extent of water rights in a stream system or groundwater basin.

Adjudication Process: to settle in the exercise of judicial authority. Results in the court issuing a final decree which defines the rights of every water right owner within the stream system or groundwater basin.

[1]*Place of Use (POU):* Any place where water is applied. Irrigated tracts are mapped in the POU_HS feature class

[2]*GPS Unit:* Trimble Pro 2012 receiver.

[3]*COGO:* Coordinate Geometry, a method of defining geometric features through the input of bearing and distance measurements. Coordinate Geometry functions are typically used by land surveyors to enter traverses around spatial features such as parcels.

[4]*Point of Diversion (POD):* Any point (well, diversion dam, ditch, etc.) at which water is diverted from its course for use in some beneficial application.

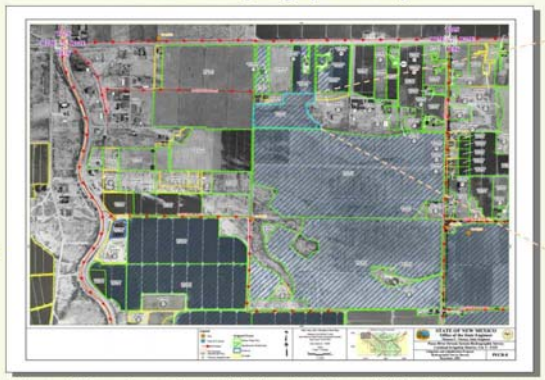
[5]*Filing Map:* Survey identifying where water has been applied (POD) and water source (POD). Filed at the Office of State Engineer District offices.

[6]*WRATS:* Water Rights Adjudication Tracking System, MS Access 97 database manages information about land owners, water rights, and adjudication activity for water right adjudications in the State of New Mexico.

Quality Assurance & Quality Control

QA/QC POU and POD locations against owners' names and irrigation district tax roll.

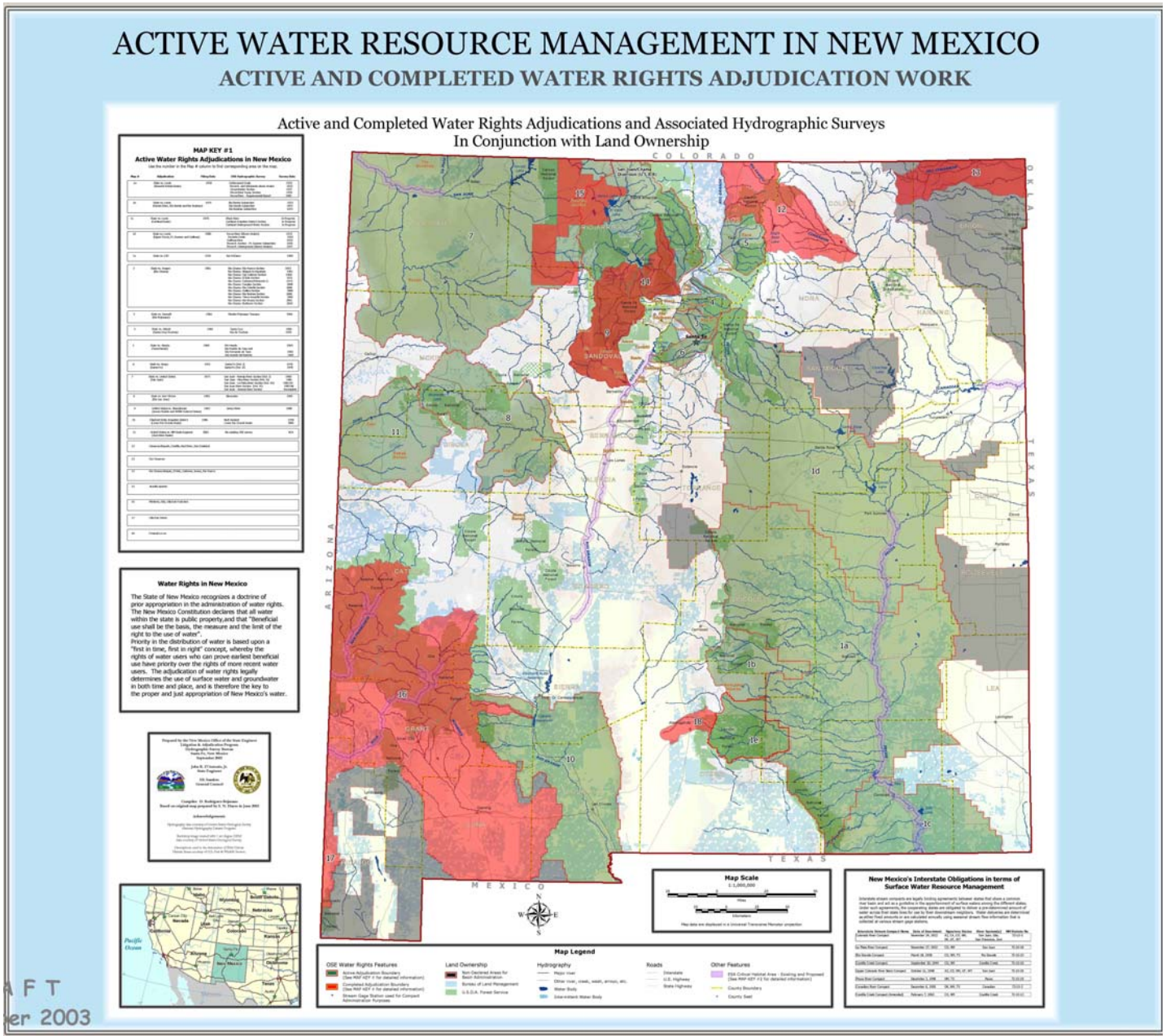
Published Hydrographic Survey



Data compilation and research results in final product to be used in the adjudication process.

Dario Rodriguez-Bejarano, PhD
Hydrographic Survey Bureau

Current state of affairs …



Linking OSE Processes: Technical Needs

OSE Processes

- **Water Rights Administration**
- **Hydrographic Survey**
- **Water Rights Adjudication**

→End Product:

- Fully Defined Elements of Each Water Right
- Maintained Over Time
- Demand Side of NM Water Equation
- Which Is: Valuable Information for Many Constituents

OSE
Process Needs

- **Easily Accessible**
- **Queriable**
- **Consistent (between the three processes)**

OSE
Database Systems

WATER RIGHTS ADMINISTRATION

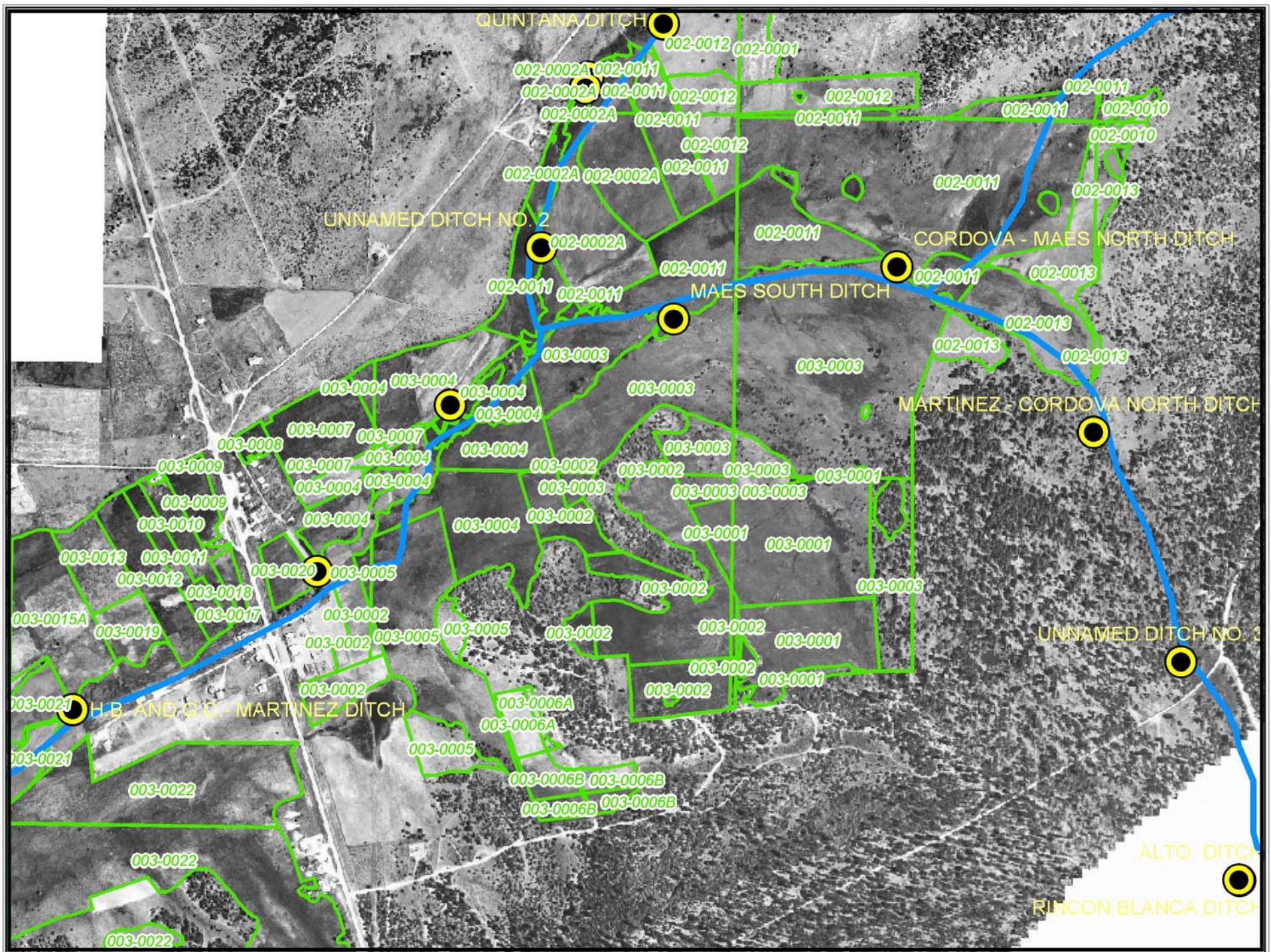
- **W.A.T.E.R.S. Database**
  - Web Based System
  - Transactional System to Maintain Time Series Data
  - Imaging System
  - Work Products for Administration of Rights
  - Continual Data Entry / Imaging (266,000 Files)

HYDRO SURVEY / ADJUDICATION

- **W.R.A.T.S. Database**
  - Carries Current Water Rights Information
  - Work Products for Adjudication
  - Data Entered for Each Adjudication
  - GIS Linked Platform

Linking OSE Processes With / Without Database Technology

- W/O: Paper Files / Maps
- **WITH: Electronic Database / GIS Platform**
- W/O: Water Rights Admin Separated From Hydro Survey and Adjudication Process
- **WITH: Seamless Process**
- W/O: Two Different Sets of Files (Admin / Adjudication)
- **WITH: Corresponding Files**
- W/O: Inefficient Methods to Communicate Change
- **WITH: Electronic Data Exchange**
- W/O: Duplication of Efforts
- **WITH: Single Taskings Shared Between Groups**


QUINTANA DITCH
UNNAMED DITCH NO. 2
CORDOVA - MAES NORTH DITCH
MAES SOUTH DITCH
MARTINEZ - CORDOVA NORTH DITCH
UNNAMED DITCH NO. 3
H.B. AND G.C. - MARTINEZ DITCH
ALTO DITCH
RINCON BLANCA DITCH
002-0012
002-0001
002-0002A
002-0011
002-0010
002-0013
003-0003
003-0004
003-0007
003-0008
003-0009
003-0010
003-0013
003-0011
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003-0020
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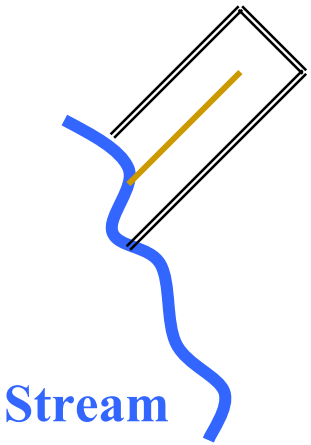
003-0015A
003-0019
003-0002
003-0001
003-0006A
003-0006B
003-0021
003-0022

ADMINISTRATION / ADJUDICATION DISCONNECTS W/O TECHNOLOGY

One Water Right File per Ditch

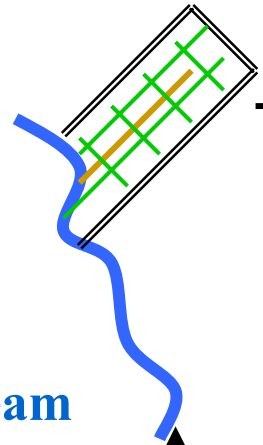


Receive & Act on Applications

↓

Update W.A.T.E.R.S.

One Subfile per Owner Set



Generate Subfiles

↓

File Orders

Update

Water Rights Administration

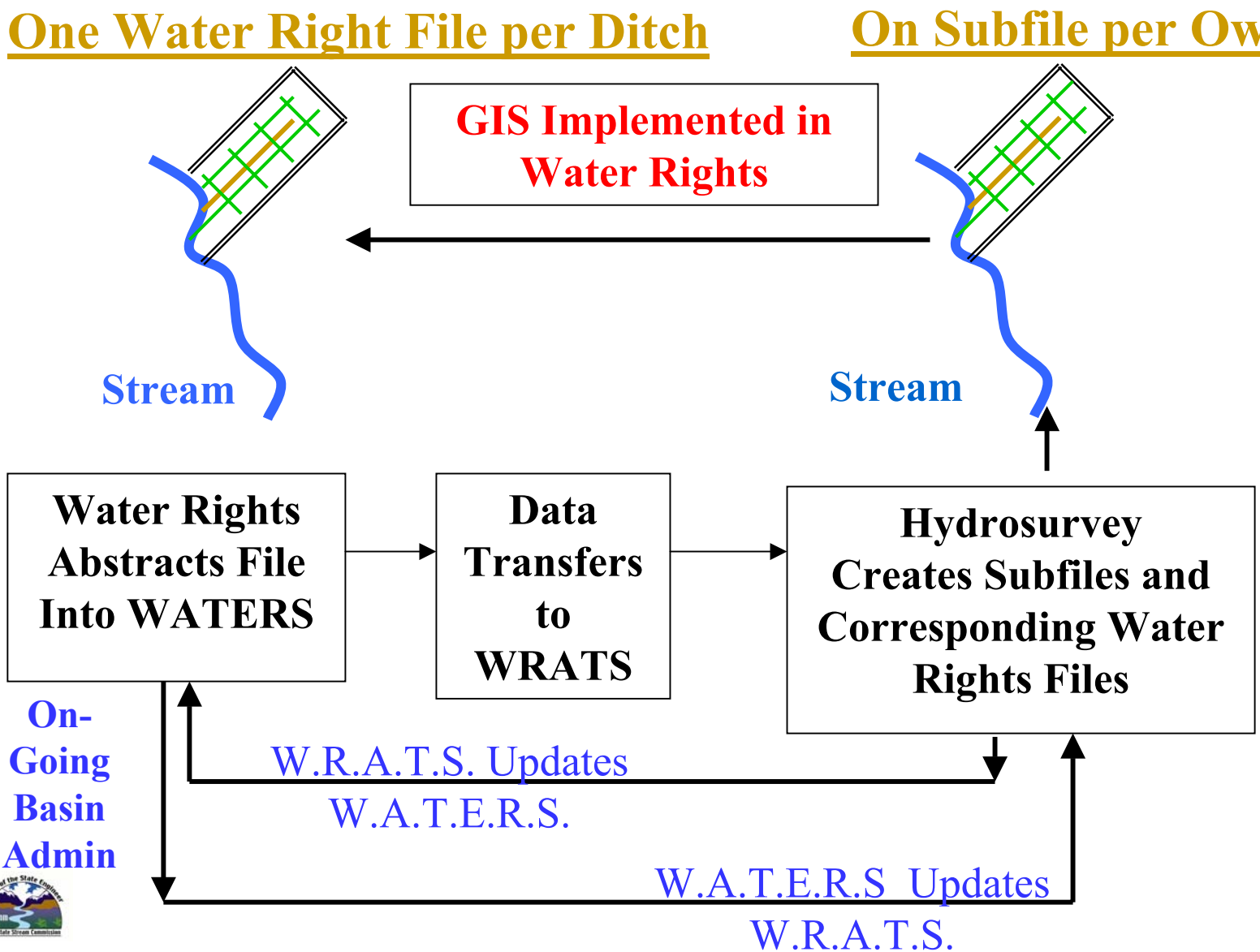
- **Analyze & Abstract the File Into W.A.T.E.R.S.**
- **Administer Basin Changes**
  - Maintain Ownership
  - Field Check
- **Update W.A.T.E.R.S.**

VERBAL ↔ VERBAL

Hydro-Survey / Adjudication

- **Abstract File Into W.R.A.T.S.**
- **Map The Basin**
- **Determine Ownership**
- **Field Verification**

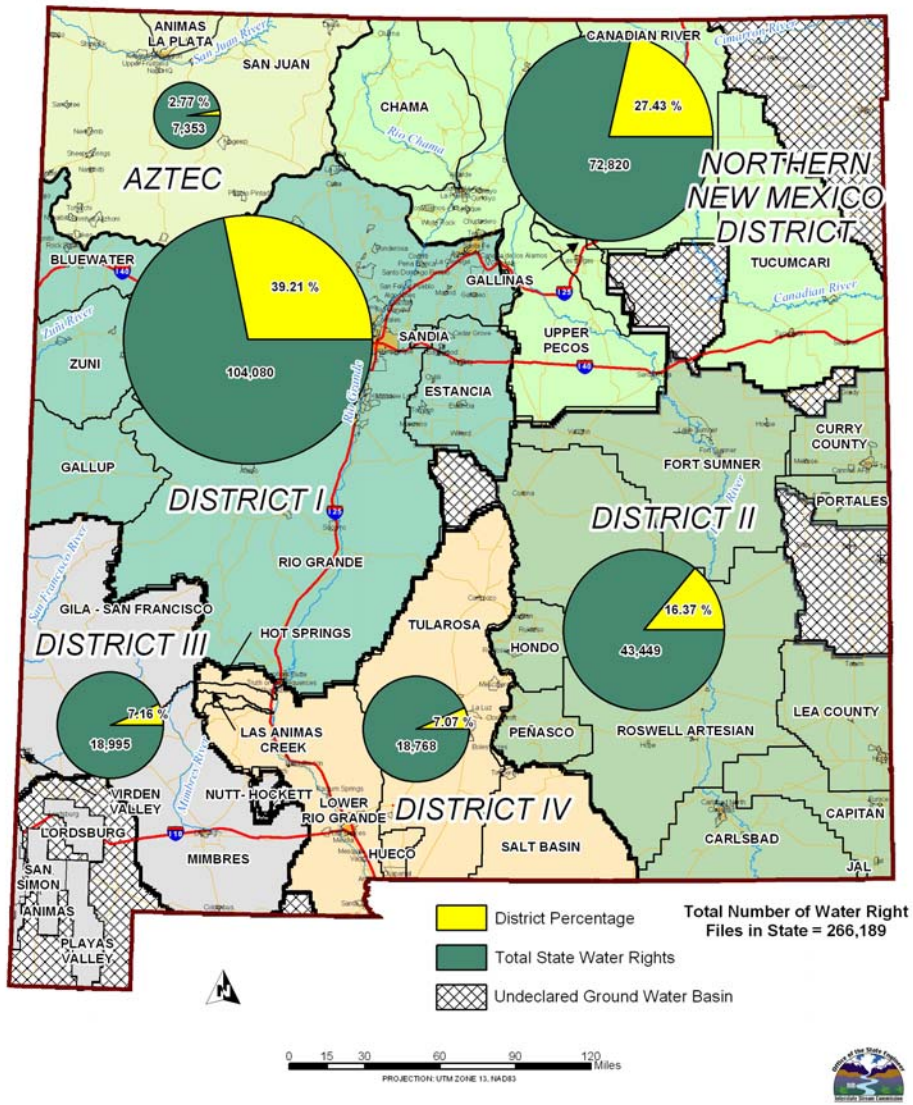
ADMINISTRATION / ADJUDICATION WITH TECHNOLOGY



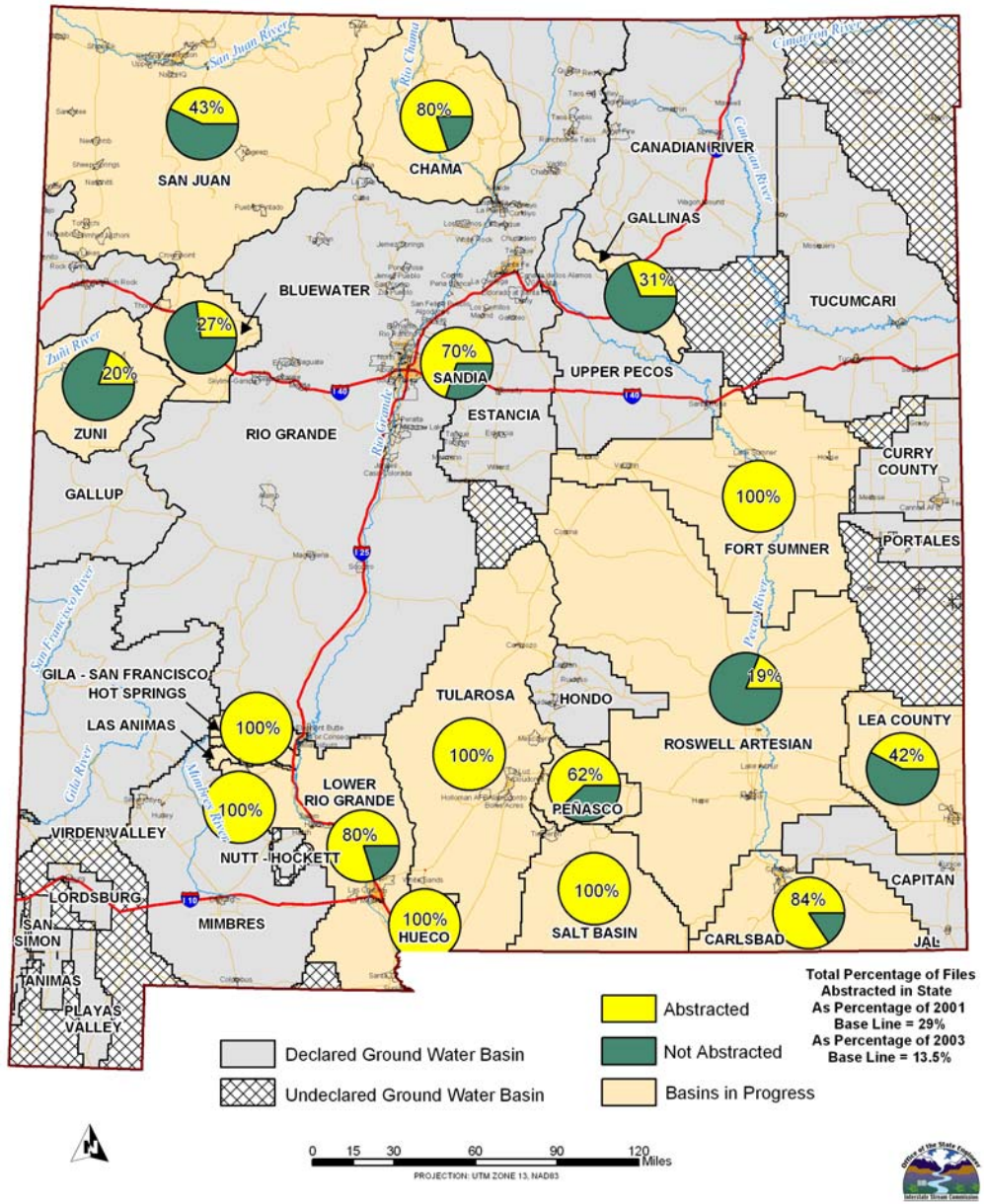
OSE Benefits
With Advanced Technology

- **Readily Available - Queriable Information**
  - **Web- Based: Database/GIS system**
- **Consistent Information:**
  - **Seamless Admin / Adjudication Process**
  - **Corresponding Admin / Adjudication Files**
- **Eliminate Duplicate Efforts**
  - **Specialization of Taskings (experts)**
  - **Electronic Data Exchange**

DISTRIBUTION OF WATER RIGHTS BY DISTRICT



PERCENTAGE OF FILES ABSTRACTED BY BASIN



Water *Resources*
Enterprise Management
The Office of the State Engineer

BLUE RIBBON WATER TASK FORCE

Santa Fe, New Mexico

23 October 2003

Water Right: Defined

The Water Right File

- Owner
- Priority Date
- Diversion Amount
- Point of Diversion (POD)
- Place of Use (POU)
- Purpose of Use

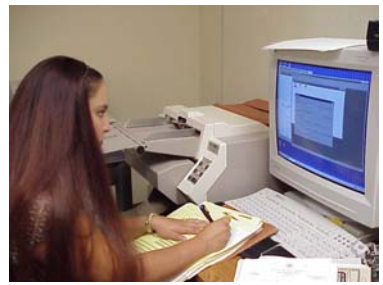
Conversion Tasks

- Abstract
- Image
- Map

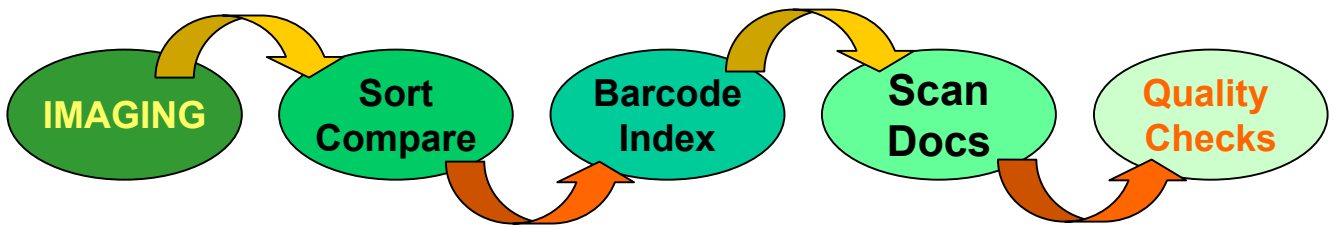
Water Right: Abstracting

- **Defined** – Organizing a Water Right File
  - **Transaction –** A change in a Water Right
- **Process** – Sort, Compare, Evaluate, Input, Check
- **Requirements –** Water Right Expert
- **Job –** Over 266,000 Water Right Files
  Over 650,000 Transactions

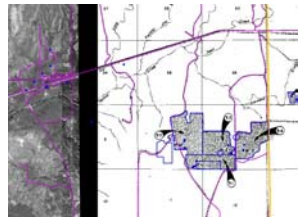
Water Right: Imaging



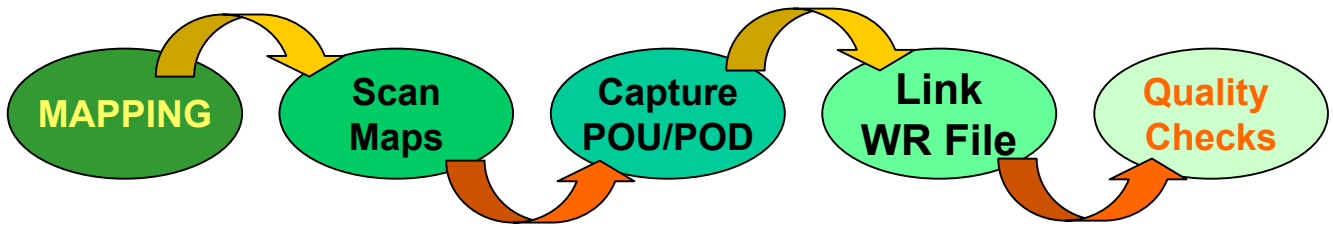
- **Defined** – Scanning Water Right File
- **Process** – Sort, Compare, Barcode Index, Scan, Check
- **Requirements –** Imaging Unit
- **Job –** Approximately 3 million pages



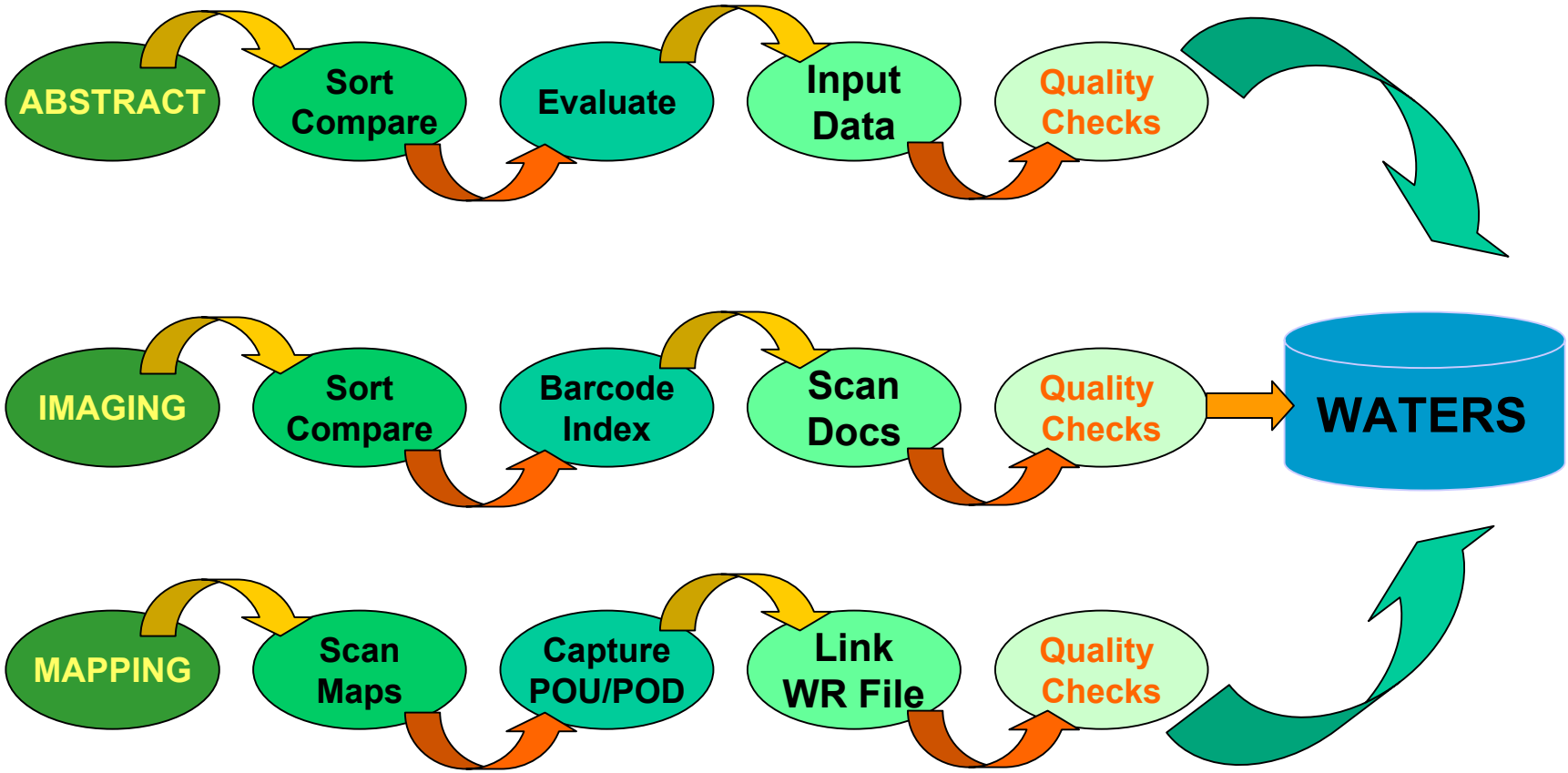
Water Right: Mapping



- **Defined** – Digitizing POD, POU, and Ditches
- **Process** – Scan, Correct, Capture, Link, Check
- **Requirements –** Geographic Information Technology
- **Job –** Over 385,000 Polygons (POU)
  Over 195,000 Points (POD)



Water Right – Integration Strategy

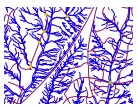


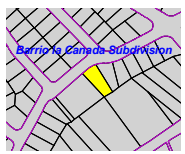
WATERS – Enterprise Concept









Internet Map Service

e-WATERS

Web Construction

Full

Mini

Water Administration

ABSTRACTING

Reengineering

WRATS

Decision Support

Adjudication

Models

WEB

WEB

WEB

WEB

WATERS

Water Administration

Technical Engineering

Resource System

IMAGING

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MAPPING

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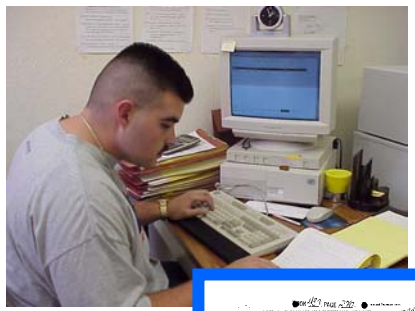
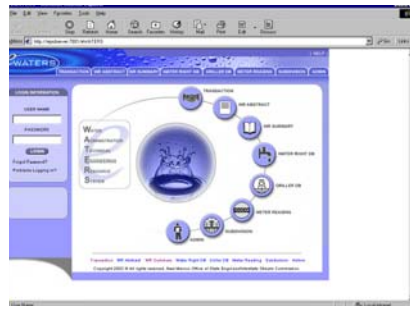
WRATS/WATERS Interface

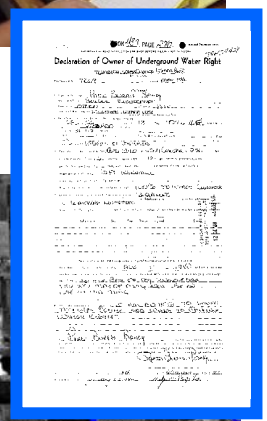
WATERS: Web Access

Abstract – Image - Map

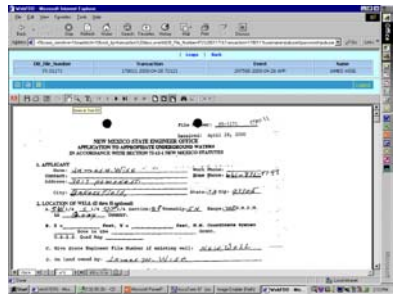


ABSTRACT

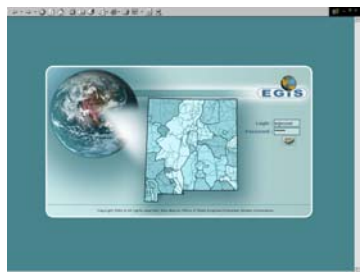




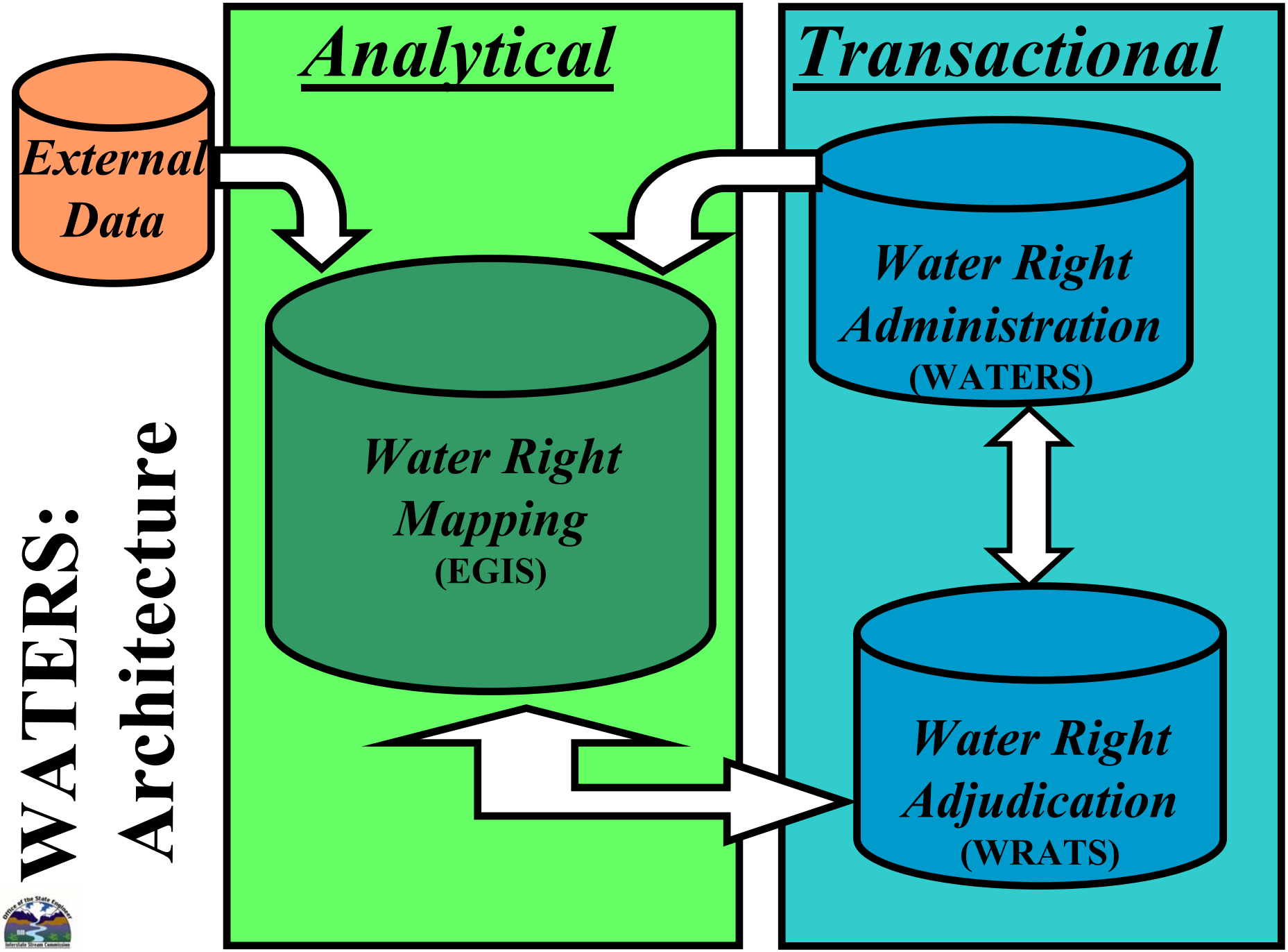
IMAGING



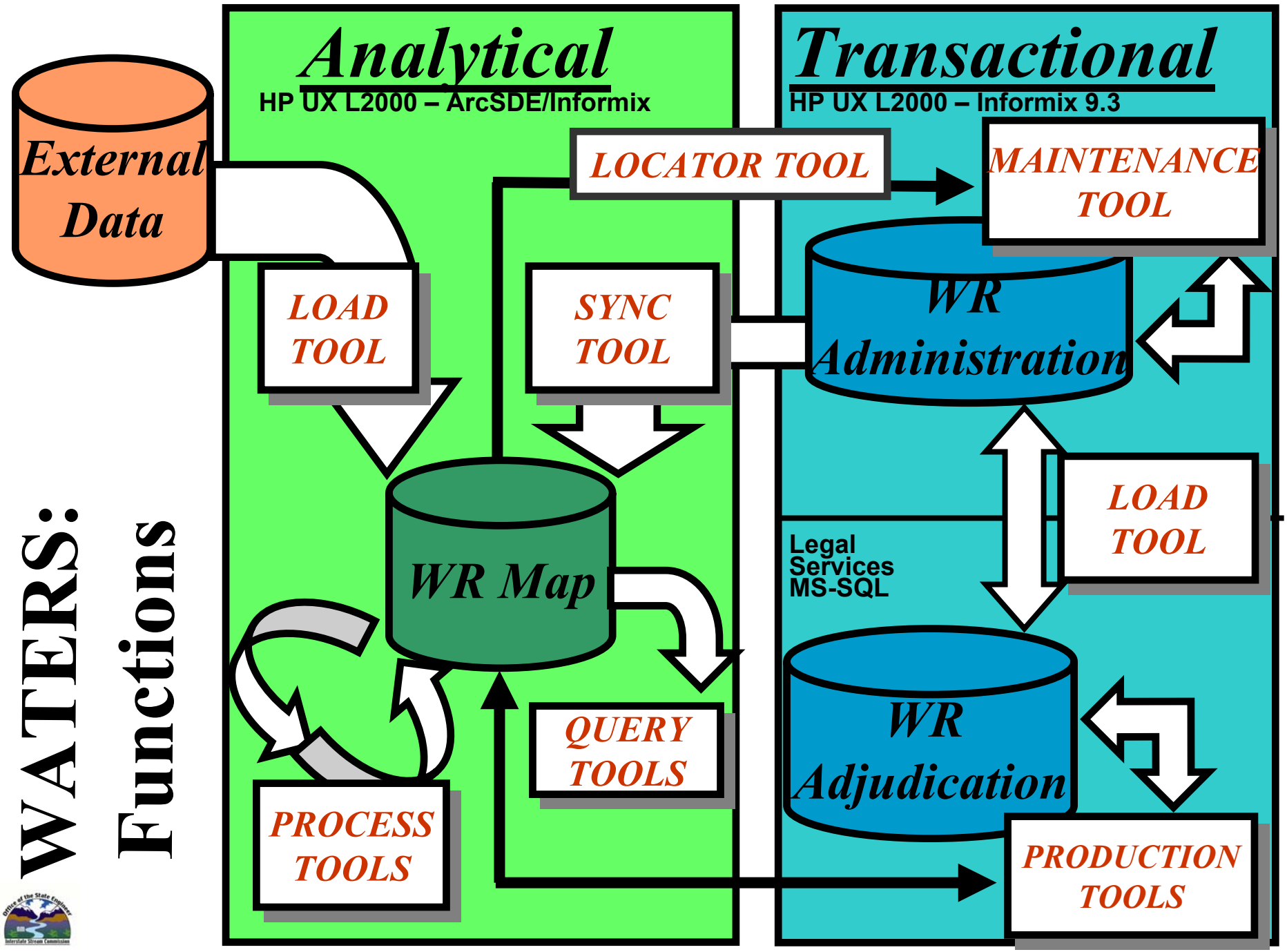
MAPPING



WATERS: Architecture



WATERS: Functions



WATERS – Decision Support

WATERS

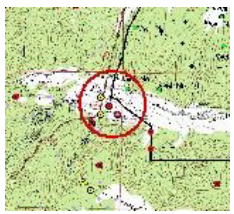
Owner - Water Use

Well Logs - Purpose of Use

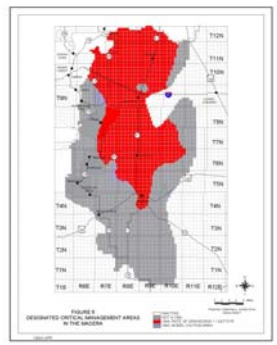
Place of Use - Priority Date

Diversion Amount

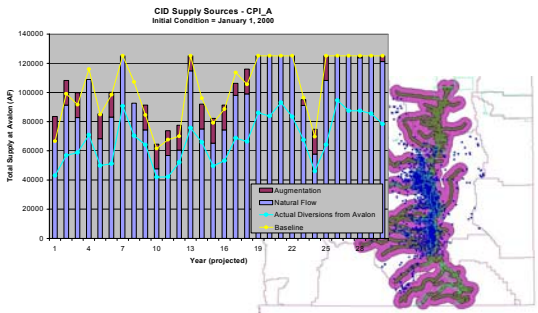
Applicant Impacts



Critical Management Areas

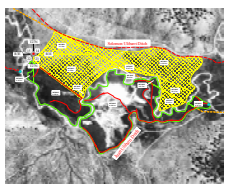


Water Availability

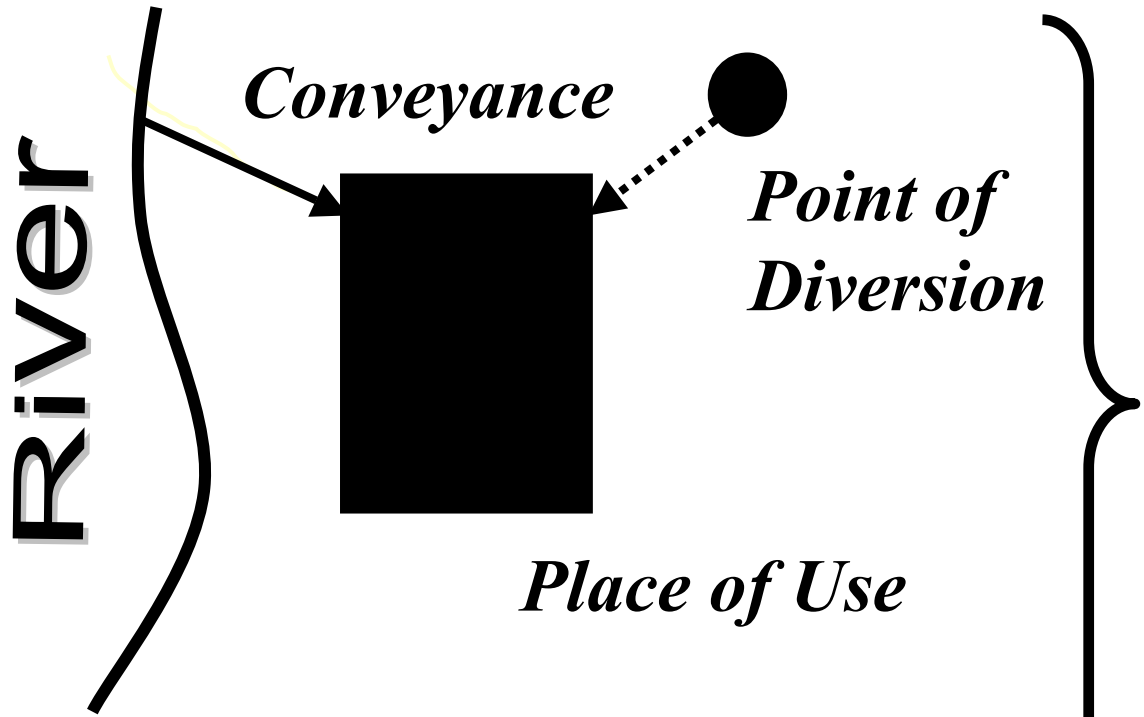


Water Plans

Hydrographic Survey



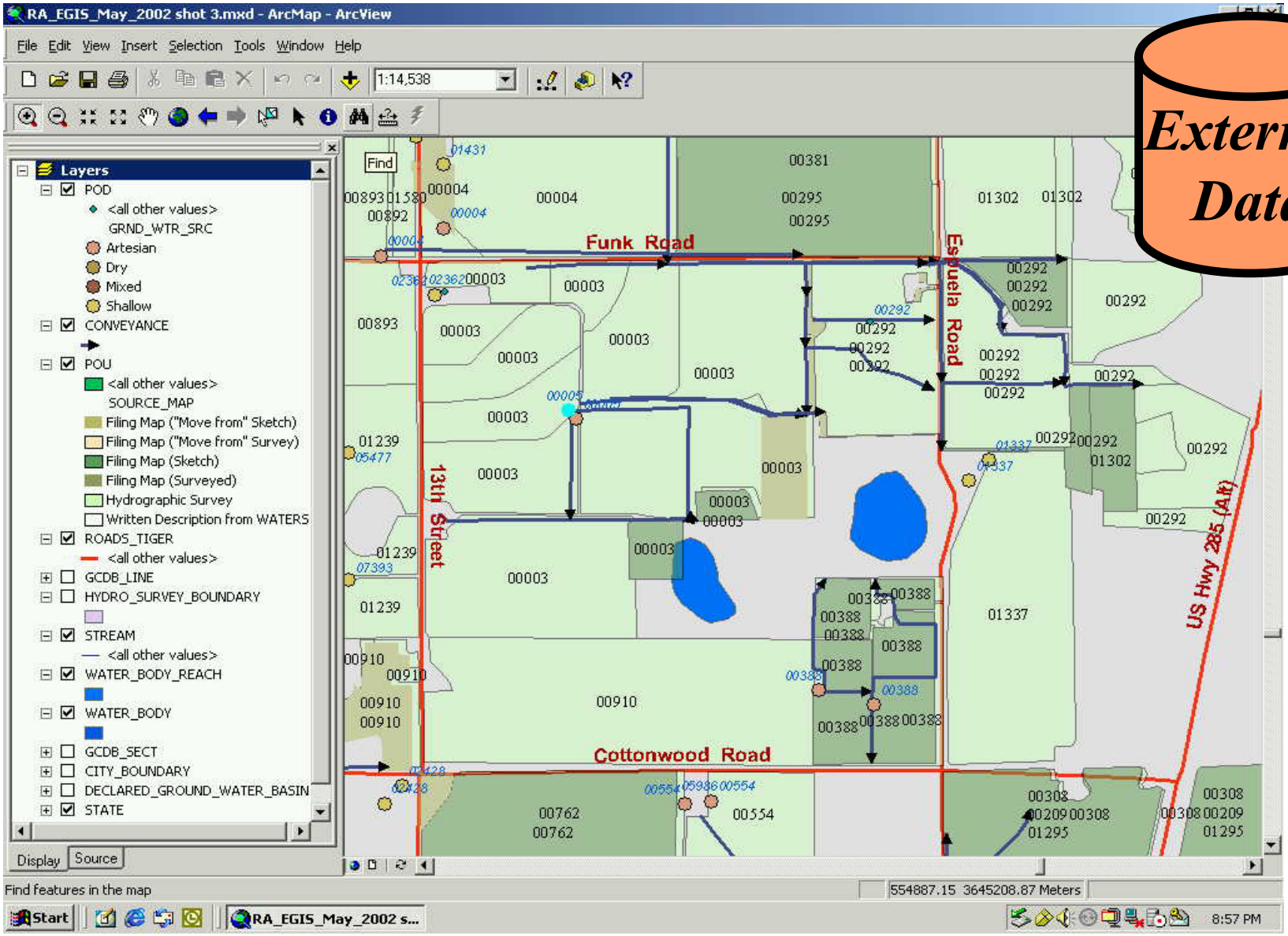
Data Needs: Map Features



Water Right Link

- ***Priority Date***
- ***Owner***
- ***Diversion***
- ***Purpose***

Data – Water Right Administration

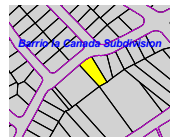


External Data

State Perspective: GISAC

OVERSIGHT: IT Commission

State Agencies



County Governments

Cities

New Mexico GIS Advisory Committee

New Mexico Municipal League

NMGIC, INC.
New Mexico Geographic Information Council, Inc.
Public Awareness • State Mapping Advisory • Geographic Information Systems
Global Positioning Systems • Geographic Names • Local Government Land Records

Resource Geographic Information System Program

Resource GIS Data Clearinghouse

New Mexico Geographic Information Council

Office of the State Engineer
Interstate Stream Commission

Statewide Mapping: Instrument

State of New Mexico
Office of the Governor

Bill Richardson
Governor

EXECUTIVE ORDER NO. 2003-018

CREATING THE NEW MEXICO
GEOSPATIAL DATA ACQUISITION COORDINATION COMMITTEE

WHEREAS, the Information Technology Commission, pursuant to its authority under NMSA 1978, Section 15-C1-5, utilizes the Geographic Information System Advisory Committee

THIS ORDER supersedes any other previous orders, proclamations, or directives in conflict. This Executive Order shall take effect immediately and shall remain in effect until such time as it is rescinded by the Governor.

ATTEST:

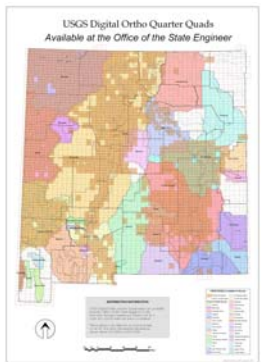
REBECCA VIGIL-GIRON
SECRETARY OF STATE

DONE AT THE EXECUTIVE OFFICE
THIS 27th DAY OF MAY, 2003

WITNESS MY HAND AND THE GREAT
SEAL OF THE STATE OF NEW MEXICO

BILL RICHARDSON
GOVERNOR

EXECUTIVE ORDER NO. 2003-018
Page 2 of 2

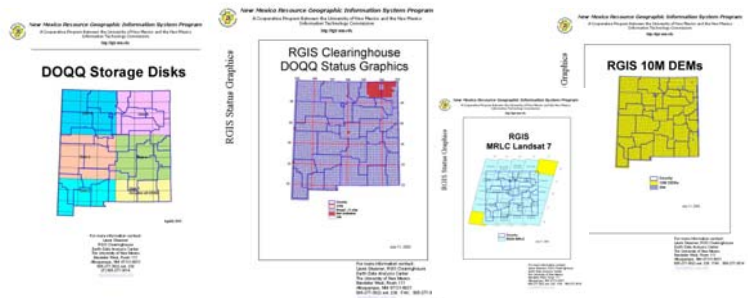


EXECUTIVE ORDER

Geospatial Data Acquistion Coordination Committee

Function:

- **Coordinate with professionals**
- **Coordinate funding requests**
- **Assess and prioritize needs**
- **Identify funding sources**
- **Generate scopes for RFI and RFP**
- **Represent the State**
- **Seek State and Federal support**



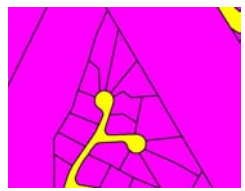
Statewide Mapping: Aerial Imagery

Statewide Imagery - $4.5M

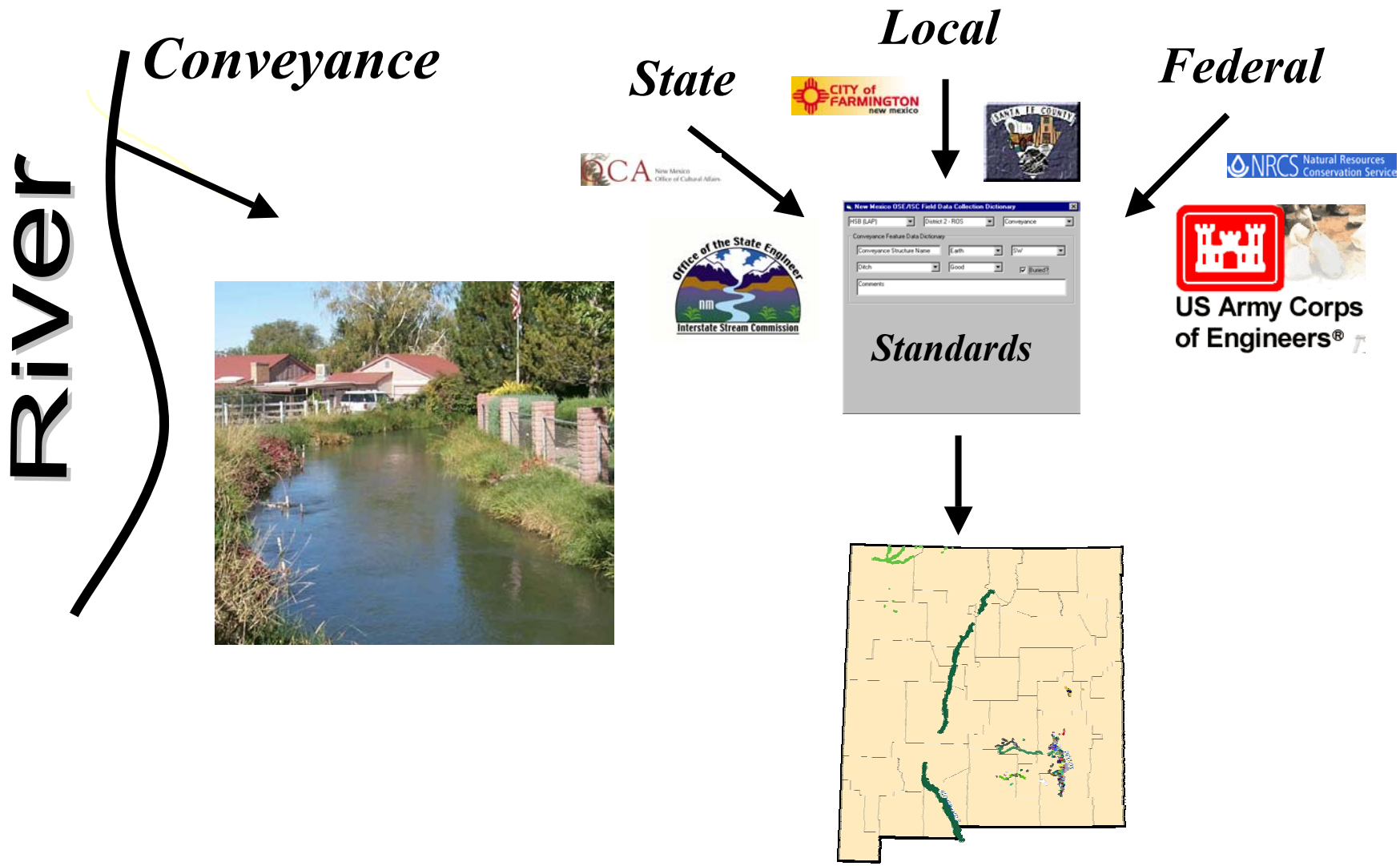
Flood Zone

Conveyance

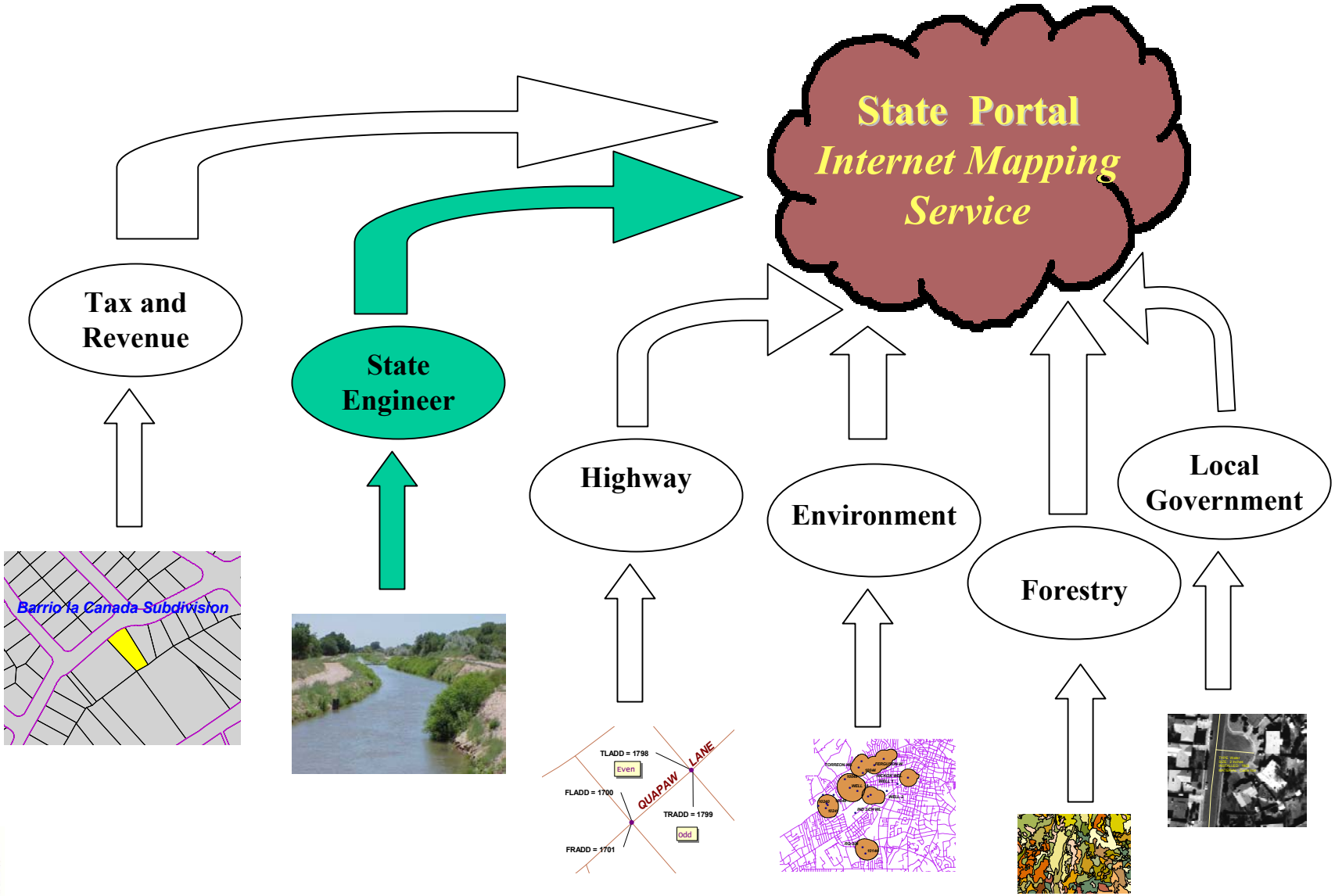
Parcels



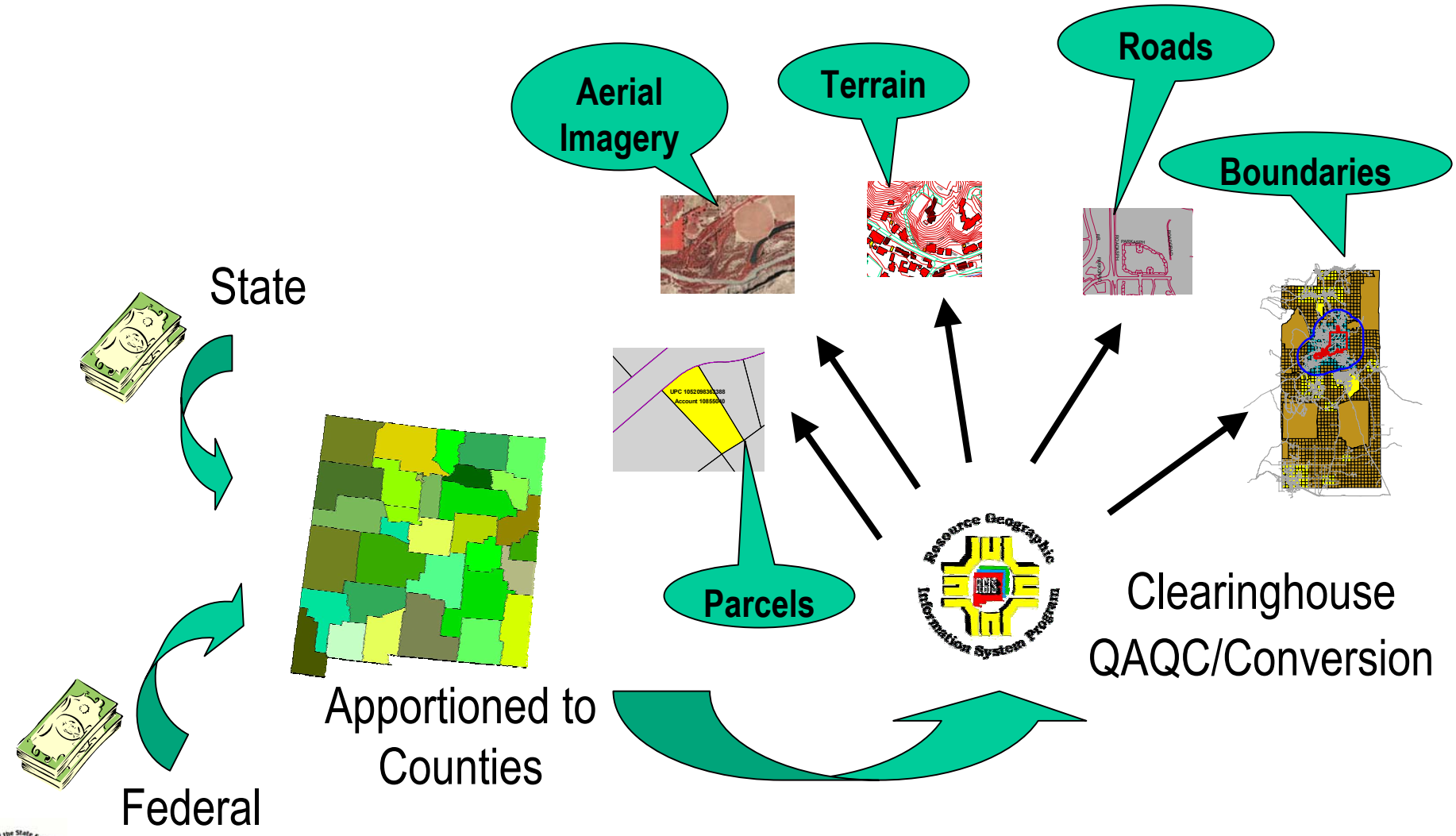
Statewide Mapping: Acequia



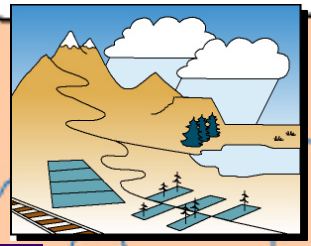
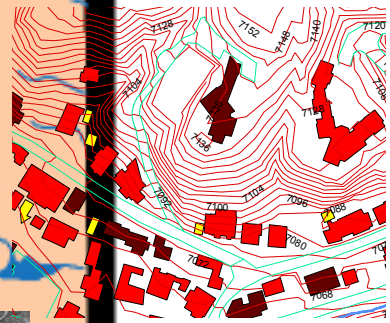
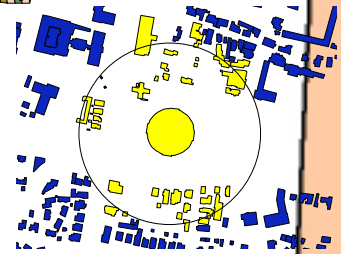
State Perspective: Access



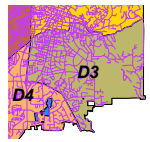
State: Funding Strategies

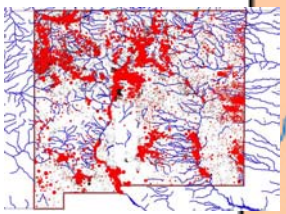


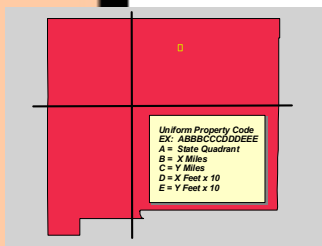


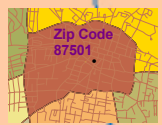




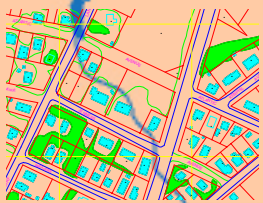
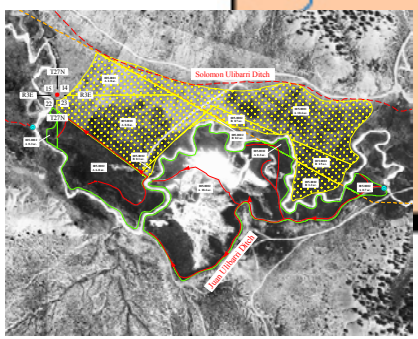


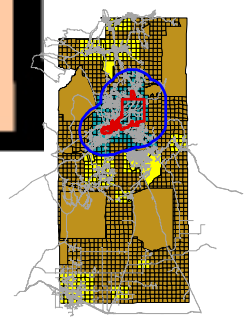










Enterprise GIS: Office of the State Engineer